

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

USM1901

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5)

09/869451

INTERNATIONAL APPLICATION NO.

PTC/6B99/04103

INTERNATIONAL FILING DATE

6 December 1999

PRIORITY DATE CLAIMED

9 January 1999

TITLE OF INVENTION

Shoe Stiffener, Material and Method for Making Same and a Method of Incorporating a Shoe Stiffener into a Shoe

APPLICANT(S) FOR DO/EO/US

Arnold, Brian

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
- ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
- ☒ A copy of the International Search Report (PCT/ISA/210).
- ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
- ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
- ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
- ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

## Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☐ Other items or information:

Form PCT/IPEA/402

Form PCT/IPEA/416

Form PCT/1B/308

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5) <b>09/869451</b>		INTERNATIONAL APPLICATION NO. <b>PTC/6B99/04103</b>		ATTORNEY'S DOCKET NUMBER <b>USM1901</b>	
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21. The following fees are submitted:				<b>CALCULATIONS PTO USE ONLY</b>	
<b>BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :</b>					
<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO .....				<b>\$1,000.00</b>	
<input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....				<b>\$860.00</b>	
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....				<b>\$710.00</b>	
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) .....				<b>\$690.00</b>	
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) .....				<b>\$100.00</b>	
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>\$860.00</b>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				<b>\$0.00</b>	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	17 - 20 =	0	x \$18.00	<b>\$0.00</b>	
Independent claims	3 - 3 =	0	x \$80.00	<b>\$0.00</b>	
Multiple Dependent Claims (check if applicable).			<input checked="" type="checkbox"/>	<b>\$270.00</b>	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$1,130.00</b>	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable).				<input type="checkbox"/>	<b>\$0.00</b>
<b>SUBTOTAL =</b>				<b>\$1,130.00</b>	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				+	<b>\$0.00</b>
<b>TOTAL NATIONAL FEE =</b>				<b>\$1,130.00</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).				<input checked="" type="checkbox"/>	<b>\$40.00</b>
<b>TOTAL FEES ENCLOSED =</b>				<b>\$1,170.00</b>	
				<b>Amount to be:</b>	\$
				<b>refunded</b>	
				<b>charged</b>	\$

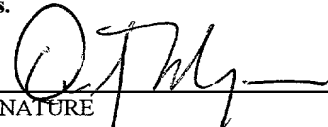
☒ A check in the amount of **\$1,170.00** to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **13-2551** A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

<b>Owen J. Meegan</b> <b>Owen J. Meegan &amp; Associates</b> <b>24 North Street</b> <b>Salem, MA 01970</b>  <b>(978) 741-4135</b>	<div style="text-align: center;">             SIGNATURE         </div> <div style="text-align: center;"> <b>Owen J. Meegan</b>            NAME         </div> <div style="text-align: center;"> <b>19,643</b>            REGISTRATION NUMBER         </div> <div style="text-align: center;"> <b>6-25-01</b>            DATE         </div>
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JUN 27 2001

## PRELIMINARY AMENDMENT

Please amend the subject application as follows:

USM1901

5 PCT/GB99/04103

## PRELIMINARY AMENDMENT

Cancel claims 1 to 21 and add the following claims

10 22. A material suitable for use in the manufacture of a  
shoe stiffener comprising a layer of a stiffener composition  
disposed between two layers of sheet material, the stiffener  
composition including a polymeric material which is stiff at  
ambient temperature and is pliable, adhesive and flowable  
under pressure at an elevated temperature, at least one of  
15 said layers of sheet material having openings therein of such  
a size so when the stiffener composition is heated to said  
elevated temperature, the stiffener can be readily manipulated  
and positioned in a shoe upper and thereafter subjected to  
pressure to cause enough of said polymeric material to flow  
20 through the openings in the sheet material and adhere to the  
adjacent shoe upper material, whereby to bond the stiffener in  
the shoe.

25 23. A material according to claim 22 wherein said ele-  
vated temperature is between 50°C and 90°C, said openings  
having a size range from 0.15 mm<sup>2</sup> to 5 mm<sup>2</sup> and the melt viscos-  
ity of the polymeric material measured at 100°C being in the  
range of 100 PAS to 10,000 Pas.

30 24. A material suitable for use in the manufacture of a  
shoe stiffener comprising;

a stiffener composition disposed between two layers of sheet material, the stiffener composition including a polymeric material which is stiff at ambient temperature below 50°C but is pliable and adhesive at an elevated temperature between 50°C and 90°C and has a melt viscosity measured at 100°C in the range from 100 Pas to 10,000 Pas and wherein at least one of said layers of sheet material has openings therein in a size range from 0.15 mm<sup>2</sup> to 5 mm<sup>2</sup>.

25. A material according to claims 22 or 24 wherein the melt viscosity of the polymeric material at 100°C is in the range from 900 Pas to 2500 Pas.

26. A material according to claims 22 or 24 wherein the openings have a size range from 0.3 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.

27. A material according to any one of the preceding claims wherein the shoe stiffener material has a thickness between about 0.4mm to 2.00mm.

28. A material according to any one of the preceding claims wherein the stiffener composition comprises between 85% and 30% by weight of said polymeric material and 15% and 70% by weight of particulate filler.

29. A material according to claim 28 wherein the particulate filler has a size between 50 microns and 500 microns.

30. A material according to claim 28 wherein the size of the particulate filler is between 100 microns and 400 microns.

31. A shoe material according to any one of claims 28 or 29 wherein the filler is mica.

32. A material according to any one of claims 28 or 29 wherein the filler is talc.

33. A material according to any one of the preceding claims wherein the polymeric material comprises polycaprolactone.

34. A material according to any one of claims 22 to 33 wherein the polymeric material comprises poly(tetramethylene-adipate).

35. A material according to any of the preceding claims wherein at least one of said layers of sheet material is a woven fabric.

36. A material according to any one of the preceding claims wherein at least one of said layers of sheet material is a knitted fabric.

37. A material according to any one of the preceding claims wherein at least one of said layers of sheet material is an apertured non-woven fabric.

38. A method of making a material according to any one of the claims 22 to 37, said method comprising:

(a) procuring two layers of sheet material, at least one of said layers having openings therein;

(b) introducing a layer of a stiffener composition between the layers of sheet material; and

(c) treating the layers to cause them to adhere to one another without the stiffener composition leaking through the openings.

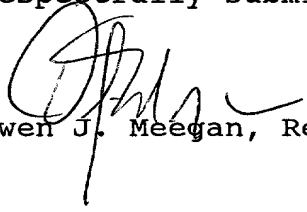
39. A method according to claim 38 wherein the layer of the stiffener composition is introduced in step (b) by extruding it and in step (c) the layers are treated by pressing and cooling.

40. A method of incorporating a shoe stiffener according to claim 38 with a shoe upper component comprising position the stiffener with one of said layers of sheet material with openings therein in face-to-face contact with the upper component, before or after said positioning heating the stiffener to such an extent that the polymeric material becomes pliable and flowable under pressure, and whilst the polymeric material is still flowable pressing the stiffener against the upper component under pressure sufficient to cause sufficient of the polymeric material to be expelled from the layer of stiffener composition through said openings, shaping the upper component and contacting stiffener to a desired shape and cooling the polymeric material or allowing it to cool, whereby the stiffener is bonded to the upper component by the expelled polymeric material and provides stiffening of the upper component.

#### REMARKS

The above amendment places the application in better U.S. practice.

Respectfully Submitted,

  
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DATED: 6/27/01

11/22/95

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JCO3 REC'D PGM 10

27 JUN 2001

WO 00/41585

PCT/GB99/04103

**SHOE STIFFENER, MATERIAL AND METHOD FOR MAKING  
SAME AND METHOD OF INCORPORATING A SHOE  
STIFFENER INTO A SHOE UPPER COMPONENT**

5 **Technical Field**

This invention is concerned with a shoe stiffener, a sheet material suitable for use in the manufacture of same, a method of making such a material and a method of incorporating a shoe stiffener into a shoe upper.

10 **Background Art**

The term "shoe" where used herein is to be understood as denoting outer footwear generally whether ready for wear or in the course of  
15 manufacture.

It is well known to incorporate shoe stiffeners in shoes to retain the shoe in a desired shape. For example shoe stiffeners are commonly included in the toe region of a shoe upper frequently referred to as "toe puffs" and in  
20 the heel end region of a shoe upper, commonly referred to as heel end stiffeners or counters.

A variety of materials have been proposed for providing such shoe stiffeners and commonly comprising polymeric materials which can be  
25 rendered relatively soft and pliable so that the shoe stiffener can be readily shaped to a desired shape but which can thereafter become relatively rigid and stiff thus to provide a shape retaining means for the shoe upper. Such polymeric materials have been applied in a variety of ways including impregnation of a suitable polymeric material into a textile fabric (woven



or non-woven), the impregnated fabric being softenable by heating and bonded to the shoe upper by application of a suitable adhesive layer (such stiffeners are supplied by the applicant company under the Registered Trade Mark "Tufflex" and "Formo"). It has also been proposed to apply  
5 polymeric material directly to a shoe upper component by coating the polymeric material onto the component using a suitable applicator. It has further been proposed to provide shoe stiffeners consisting of a sheet of thermoplastic polymeric material which can be rendered pliable and adhesive by heating to an appropriate temperature: such a shoe stiffener is  
10 described in European Patent No. 0183912.

For the manufacture of certain types of shoe it would be desirable to provide a shoe stiffener which can be first heated to a temperature sufficient that the stiffener becomes pliable and adhesive but which can  
15 nevertheless be manipulated comfortably by hand without sticking to or burning the fingers of an operator but such a stiffener has not been satisfactorily provided heretofore.

It is one of the various objects of the present invention to provide an  
20 improved material suitable for use in the manufacture of a shoe stiffener.

Another object of the present invention is to provide an improved shoe stiffener.

25 Yet a further object of the present invention is to provide an improved method of incorporating a shoe stiffener with a shoe upper component.

#### Disclosure of Invention

INT 24 AMBT

In another aspect the invention may be considered to provide a material suitable for use in the manufacture of a shoe stiffener consisting of a stiffener composition between two layers of sheet material, the stiffener composition including a polymeric material which is stiff at ambient  
5 temperature below 50°C but is pliable and adhesive at an elevated temperature between 50°C and 90°C and has a melt viscosity measured at 100°C in the range from 100 Pas to 10,000 Pas and wherein at least one of said layers of sheet material has openings therein in a size range from 0.15 mm<sup>2</sup> to 5 mm<sup>2</sup>.

10

The polymeric material is flowable under pressure at said elevated temperature such that when the stiffener composition is heated to said elevated temperature the stiffener can be readily manipulated and positioned in a shoe upper and thereafter subjected to pressure to cause  
15 sufficient of the polymeric material to flow through the openings in the sheet material and adhere to adjacent shoe upper materials whereby to bond the stiffener in the shoe.

Size ranges where referred to herein refer to linear dimensions; thus the  
20 areas of the openings in said layer of sheet material range, approximately between about 0.02 sq mm and 25 sq mm.

In a preferred material in accordance with the invention the elevated temperature is in the range from 60°C to 80°C, more preferably about

75°C to 80°C.

Preferably the melt viscosity of the polymeric material in a material according to the invention at 100°C is in the range from 900 Pas to 2500 Pas, more preferably about 1500 Pas. The viscosity of the stiffener composition is preferably not more than 10,000 PaS. Viscosity is conveniently measured by a capillary rheometer at low shear on an instrument such as a Rosand capillary rheometer.

In a preferred material in accordance with the invention the openings in said layer of sheet material have a size range from 0.3 mm<sup>2</sup> to 1.5 mm<sup>2</sup> (opening areas between about 0.09 sq. mm and 2.25 sq mm).

In one embodiment the size range is about 0.5 mm<sup>2</sup> (area about 0.25 sq mm); in another embodiment the size of the openings is about 0.4 mm x 0.95 mm (area about 0.38 sq. mm). The sizes of the openings can be measured in any convenient way. For example, for rectangular openings in a woven scrim, the length and breadth of a number of openings can be determined under a microscope and an average taken to calculate an average opening area. More irregular openings eg. in an apertured non-woven fabric can be measured by producing an enlarged image of the fabric, using a planimeter to measure the area and correcting to take account of the magnification.

Preferably a sheet material in accordance with the invention has a thickness from 0.4mm up to 2.00mm, more preferably from 0.7mm up to 1.2mm.

Whereas the layer of stiffener composition of a material in accordance

with the invention may consist solely of a polymeric material, the stiffener composition preferably comprises a mixture of a polymeric material and a particulate filler. The use of a suitable filler can enhance the rigidity of the stiffener composition when cold. Suitably, the stiffener composition in  
5 a material in accordance with the invention comprises between 85% and 30% by weight of polymeric material and 15% and 70% by weight of particulate filler; however, preferably the filler content does not exceed 50%. The polymeric material may, if desired, comprise a mixture of different polymers and the filler may comprise a mixture of particulate  
10 fillers.

When a particulate filler is used in a stiffener composition of a material in accordance with the invention, the particle size of the filler should be in a suitable size range, preferably between 50 microns and 500 microns and  
15 more preferably between 100 microns and 400 microns.

Polymeric materials are often mixed with fillers and many of the fillers which are commonly used for compounding with polymeric materials may be suitable for use in a stiffener composition in a material in accordance  
20 with the invention. Amongst the most suitable materials are mica and talc.

The layers of sheet material between which the stiffener composition is carried may be provided by any suitable sheet material. Amongst suitable  
25 materials are woven or knitted fabrics, and apertured non-woven fabric.

The sheet material chosen for use in the manufacture of material in accordance with the invention will depend on the viscosity of the polymeric material and the size of the openings in the sheet material. It

will be appreciated that if the openings are too small the polymeric material will not be able to flow through the openings to bond to the adjacent shoe upper component whereas if the openings are too large this can lead to difficulties when handling the hot shoe stiffener materials. A  
5 textile fabric of a type commonly referred to as scrim may be suitable. Some melt bonded fabrics may also be suitable, for example the fabric supplied under the trade name "Reemay". Warp-knitted fabrics may also be particularly useful. Textile fibres which may be used in a suitable textile fabric include cotton, cotton/polyester blends, polyester and nylon  
10 fibres.

Preferred polymeric materials suitable for use in stiffener composition of materials in accordance with the invention include polycaprolactone and poly(tetramethylene-adipate).

15

In another aspect the invention may be considered to provide a shoe stiffener comprising a material in accordance with the invention.

In yet another aspect the invention may be considered to provide a method  
20 of making a material in accordance with the invention, the method comprising:

- (a) procuring two layers of sheet material, at least one having openings therein
- (b) introducing a layer of a stiffener composition between the  
25 layers of sheet material and
- (c) treating the layers to cause them to adhere to one another without the stiffener composition leaking through the openings.

Preferably, in a method as set out in the last preceding paragraph, the

layer of stiffener composition is introduced in step (b) by extruding molten stiffener composition and, in step (c), the layers are treated by pressing and cooling.

- 5 In yet another aspect the invention may be considered to provide a method of incorporating a shoe stiffener with a shoe upper component comprising positioning the stiffener with one of said layers of sheet material with openings therein in face-to-face contact with the upper component, before or after said positioning heating the stiffener to such an extent that the
- 10 polymeric material becomes pliable and flowable under pressure, and whilst the polymeric material is still flowable pressing the stiffener against the upper component under pressure sufficient to cause sufficient of the polymeric material to be expelled from the layer of stiffener composition through said openings, shaping the upper component and contacting
- 15 stiffener to a desired shape and cooling the polymeric material or allowing it to cool, whereby the stiffener is bonded to the upper component by the expelled polymeric material and provides stiffening of the upper component.
- 20 There now follow detailed descriptions to be read with reference to the accompanying drawing of shoe stiffeners and sheet materials embodying the invention, a method of making the stiffeners and a method of incorporating them into a shoe, also embodying the invention. It will be realised that the materials, stiffeners and methods have been selected for
- 25 description to illustrate the invention by way of example.

#### Brief Description of Drawing

In the accompanying drawing:-

Figure 1 is a diagrammatic view showing the incorporation of a shoe stiffener embodying the invention into a shoe upper.

### Modes for Carrying Out the Invention

5

In Figure 1 an illustrative shoe stiffener 10 embodying the invention is shown positioned between two shoe upper components, namely an outer integument 12 of the upper and a lining material 14. The illustrative shoe stiffener 10 is a shoe counter and the counter 10 is within a counter pocket  
10 formed by stitching the periphery of the lining material 14 to the outer integument 12 of the upper in known manner.

The outer integument 12 may be any suitable material, for example leather. The lining material 14 may be a suitable known lining material,  
15 for example the non-woven impregnated textile fibre based material supplied by the applicant company under the trade mark Aquiline.

The illustrative shoe stiffener is cut, in known manner from a sheet of material embodying the invention in its material aspects.

20

The illustrative shoe stiffeners comprise a first layer 16 of sheet material and a second layer 18 of sheet material. Between the layers 16, 18 is a layer 22 of a stiffener composition which includes a polymeric material that is stiff at ambient temperature and is pliable, adhesive and flowable  
25 under pressure at an elevated temperature. The polymer is polycaprolactone which becomes pliable adhesive and flowable under pressure at a temperature of about 80°C. The stiffener composition further comprises a mica particulate filler having a particle size in the range of 0.05mm to 0.25mm which is present in an amount of about 25%

by weight, the polycaprolactone being present in an amount of about 75 %  
by weight.

In the first illustrative stiffener both layers 16, 18 are cotton textile fibre  
5 woven scrims having openings 20 therein each opening having an area of  
about 0.5 mm<sup>2</sup> and being generally rectangular in shape.

A second illustrative stiffener, otherwise similar to the first illustrative  
stiffener, uses sheet material for the layers 16, 18 which is a woven  
10 polyester scrim having openings 20 which are about 0.4 mm x 0.95 mm  
(area about 0.38 sq mm).

The illustrative materials are made by hot-melt extruding the layer 22 of  
stiffener composition between the two layers 16, 18 of sheet material and  
15 rapidly cooling the laminated material by passing it through the nip  
between a pair of cooled calendar rolls of a calendar roll stack about  
which the laminated material is passed. The pressure applied by the rolls  
is relatively light - sufficient to cause the outer layers 16, 18 to bond to the  
stiffener composition 22 but not sufficient for the material of the stiffener  
20 composition 22 to be expelled through the openings 20 in the layers 16,  
18.

The thus made laminated stiffener material is rolled onto a reel. When it  
is wished to make illustrative shoe stiffeners, the laminated material is  
25 unrolled from the reel and stiffeners are cut from the laminated material  
using cutting knives in a manner which is generally well known to those  
skilled in the art.

When it is wished to incorporate one of the illustrative shoe counters into



the heel end region of a shoe, a counter pocket is first made on the shoe upper by stitching the lining material 14 to the outer integument 12 of the shoe upper to provide a pocket into which the illustrative shoe counter may be placed when it has been activated.

5

In carrying out the illustrative method, the counter 10 is first heated to an elevated temperature sufficiently high that the stiffener composition 22 becomes pliable, tacky and flowable under pressure. A suitable temperature is about 80-85°C. The stiffener composition does not flow  
10 through the holes 20 until it is subjected to significant pressure and the fabric layers 16, 18 provide a barrier so that the shoe counter 10 can be handled comfortably by an operator when hot; the relatively low thermal conductivity of the fabric also assists in this respect.

15 In this hot and pliable condition the shoe counter 10 is introduced into the counter pocket between the outer integument 12 and the lining material 14. The shoe upper, including the counter, is then subjected to a lasting operation which shapes the shoe upper around a last and the upper is retained in this shaped condition until the stiffener composition has cooled  
20 below its activation temperature and solidified to a rigid condition.

During the lasting operation considerable pressure is exerted on the shoe upper and the exerted pressure is sufficient to cause sufficient of the polymeric material in the stiffener composition 22 to be expelled through  
25 the openings 20 in the layers 16, 18. This expelled material 24 is forced firmly into engagement with the adjacent one of the layers 16, 18 whilst still in a tacky adhesive condition and may spread sideways from the openings 20 between the layers 16, 18 and the adjacent one of the upper components 12, 14. When the stiffener composition is cooled, the

material 24 which has been expelled through the openings 20 bonds the counter 10 firmly to the upper components 12, 14 providing a relatively rigid and shape-retaining back part to the shoe upper.

- 5 Those skilled in the art will be aware that it is common practice to skive the margins of shoe counters to provide a tapering (or skived) edge portion which permits the counter to blend with the upper component without uncomfortable and unsightly ridges in the shoe upper.
- 10 The illustrative shoe counters as well as being readily mouldable and self-adhesive have a relatively high modulus so that the counter material is relatively thin (for a particular stiffness) and thus this, in some cases, may allow the illustrative counters to be used without skiving. This may be assisted by the relatively flowable nature of the stiffener composition 22
- 15 under lasting pressures which will tend to flow away from the edge portions (at which pressures may tend to be greatest) and towards a central region of the counter where greatest stiffness is required.

The layers 16, 18 of the illustrative counters 10 also provide

20 reinforcement of the counter against tensile forces which, in the absence of the layers 16, 18, may be resisted less adequately.

Whereas in carrying out the illustrative method of incorporating the illustrative counters 10 in a shoe, the shoe counter 10 is first heated and

25 activated so that the stiffener composition 22 is in a pliable tacky and flowable condition before introduction into the counter pocket, the illustrative counters 10, in carrying out another method of incorporating the counters in a shoe in accordance with the invention, may be introduced into a counter pocket whilst cold and the whole shoe heated until the

stiffener composition 22 reaches activation temperature, the shoe thereafter being lasted.

Whereas the illustrative shoe counters 10 have layers 16, 18 on both sides which have openings 20 therein, in the manufacture of a counter in accordance with the invention, only one of the layers 16, 18 may be provided with openings and the other layer may be substantially continuous. This continuous layer may be a shoe lining material of a type known to those skilled in the art, for example Aquiline mentioned previously. In that case the stiffener would probably not be handled hot and it would be necessary to temporarily attach the counter to the shoe upper by other means, for example stitching or a tacking adhesive with the layer having the openings 20 adjacent the outer integument of the shoe upper, either before or after activation of the stiffener composition, and then the shoe lasted as described previously.

Whereas the preferred shoe stiffener materials are made by extruding the stiffener composition between two layers 16, 18, it will be appreciated that the stiffener composition may be introduced in other ways, for example a pre-extruded sheet may be positioned between two fabric layers and laminated thereto by applying slight heat and pressure (sufficient to adhere the fabric layers to the stiffener composition but not sufficiently great to cause the stiffener composition to flow through openings in the fabric). Other methods may also be suitable.

08-01-2001

CLAIMS

1. A material suitable for use in the manufacture of a shoe stiffener consisting of a stiffener composition between two layers of sheet material,  
5 the stiffener composition including a polymeric material which is stiff at ambient temperature below 50°C but is pliable and adhesive at an elevated temperature between 50°C and 90°C and has a melt viscosity measured at 100°C in the range from 100 Pas to 10,000 Pas and wherein at least one of said layers of sheet material has openings therein in a size range from  
10 0.15 mm<sup>2</sup> to 5 mm<sup>2</sup>.
2. A material according to claim 1 wherein the elevated temperature is in the range from 60°C to 80°C.
- 15 3. A material according to either one of claims 1 and 2 wherein the melt viscosity of the polymeric material at 100°C is in the range from 900 Pas to 2500 Pas.
4. A material according to any one of the preceding claims wherein  
20 the openings have a size range from 0.3 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.
5. A material according to any one of the preceding claims wherein the shoe stiffener material is from 0.4mm up to 2.00mm in thickness.
- 25 6. A material according to any one of the preceding claims wherein the stiffener composition comprises between 85% and 30% by weight of said polymeric material and 15% and 70% by weight of particulate filler.
7. A material according to claim 6 wherein the particulate filler has a

size between 50 microns and 500 microns.

8. A material according to claim 7 wherein the size of the particulate filler is between 100 microns and 400 microns.

5

9. A material according to any one of claims 6 to 8 wherein the filler is mica.

10

10. A material according to any one of claims 6 to 8 wherein the filler is talc.

11. A material according to any one of the preceding claims wherein the polymeric material comprises polycaprolactone.

15

12. A material according to any one of claims 1 to 10 wherein the polymeric material comprises poly(tetramethylene-adipate).

13. A material according to any one of the preceding claims wherein at least one of said layers of sheet material is a woven fabric.

20

14. A material according to any one of the preceding claims wherein at least one of said layers of sheet material is a knitted fabric.

15. A material according to any one of the preceding claims wherein at least one of said layers of sheet material is an apertured non-woven fabric.

25

16. A shoe stiffener comprising a material in accordance with any one of the preceding claims.

17. A method of incorporating a shoe stiffener according to claim 16 with a shoe upper component comprising positioning the stiffener with one of said layers of sheet material with openings therein in face-to-face  
5 contact with the upper component, before or after said positioning heating the stiffener to a temperature between 50°C and 90°C at which the polymeric material becomes pliable and flowable under pressure, and whilst the polymeric material is still flowable pressing the stiffener against the upper component under pressure sufficient to cause sufficient of the  
10 polymeric material to be expelled from the layer of stiffener composition through said openings, shaping the upper component and contacting stiffener to a desired shape and cooling the polymeric material or allowing it to cool, whereby the stiffener is bonded to the upper component by the expelled polymeric material and provides stiffening of the upper  
15 component.

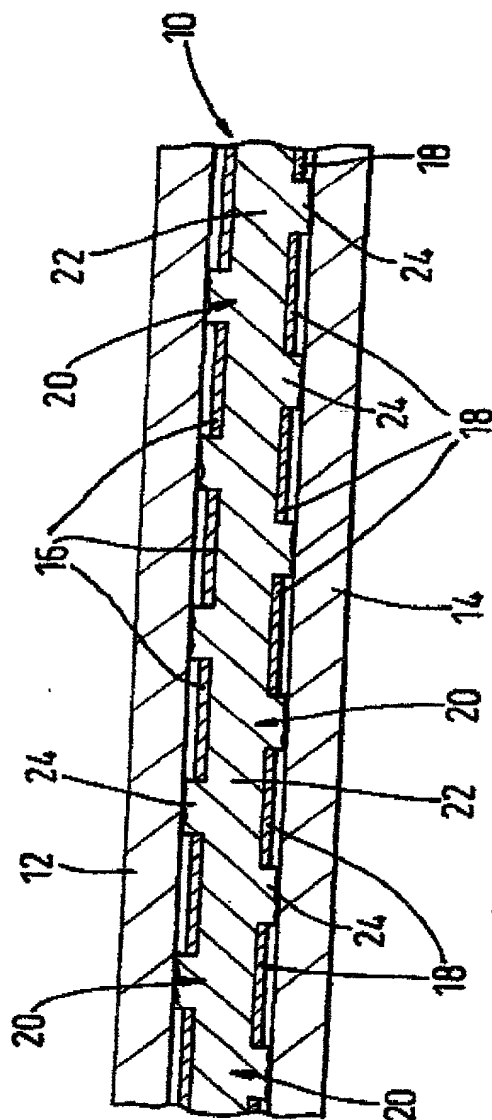


Fig. 1

Docket No.  
USM1899

# Declaration and Power of Attorney For Patent Application

## English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Shoe Stiffener, Material and Method for Making Same and Method of Incorporating a Shoe Stiffener into a Shoe Upper Component

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on July 9, 2001 as United States Application No. or PCT International Application Number PCT/GB99/04103 and was amended on 8th January 2001

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

<u>GB</u>	<u>9900384.0</u>	<u>09/01/1999</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<u></u>	<u></u>	<u></u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<u></u>	<u></u>	<u></u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	



I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application

TH 049292	16th March 1999	Pending
(Application Serial No.)	(Filing Date)	(Status)
TW 88103842	12th March 1999	(patented, pending, abandoned) Pending
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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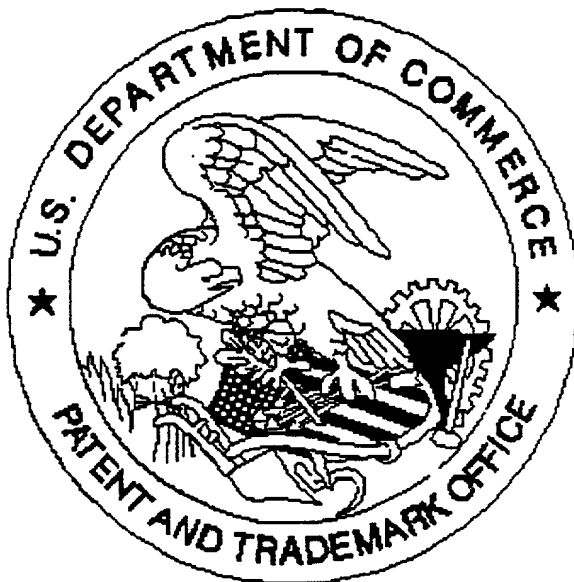
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Second inventor's signature	Date
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